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AIR FORCE INSTRUCTION 63-123

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Acquisition

EVOLUTIONARY ACQUISITION FOR C2 SYSTEMS

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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OPR: SAF/AQII (Lt Col Ron Warner)

Certified by: SAF/AQII (Col Henry A. Obering)

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This instruction implements AFPD 63-1, *Acquisition System*. It guides and directs the use of an Evolutionary Acquisition (EA) strategy using a spiral development process in support of the acquisition of Command and Control (C2) systems. This instruction encompasses all system acquisition life-cycle activities of C2 systems, existing or planned, from an initial idea or technological opportunity through fielding and sustainment. This instruction establishes the policy and procedures and assigns responsibilities, when using an EA strategy to incrementally acquire C2 systems through an embedded spiral development process. It includes provisions for the evolutionary acquisition of successive capabilities as requirements are refined and technologies mature. It applies to all organizations that develop, procure, modify, test, and support C2 systems. This instruction is consistent with Division E of Public Law 104-106 of the Information Technology Reform Act (ITMRA) of 1996. It will be used in conjunction with Department of Defense (DoD) Directive 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Programs (MDAP) and Major Automated Information Systems (MAIS) Acquisition Programs*, and with other Air Force and DoD publications listed under References in **Attachment 1**.

1. Scope. Only those C2 programs where the user and the Milestone Decision Authority (MDA) jointly agree not to use an EA strategy with a spiral development process are exempt from this AFI. The exemption shall be documented in a Single Acquisition Management Plan (SAMP) or Acquisition Plan (AP).

2. Need for Change. Command and Control should be managed as one integrated weapon system. Integral to prudent C2 system management is an acquisition strategy that quickly adapts to evolving requirements and ever-shortening technology life-cycles. The need becomes stronger when using commercial technology in the development and fielding of C2 systems. Traditional DoD acquisition processes developed during the cold-war era were oriented toward larger systems designed for unique military requirements and are not often suitable for today's rapid technology changes and continuous requirement refinements. The EA strategy will accommodate continuous change resulting from one or more of the following: uncertainty about details or maturity of requirements, continuous user feedback, shortened

technology insertion life-cycles, schedule urgency, budget and/or cost uncertainty, technical risk, and feedback from test, evaluations, experiments and exercises.

3. Evolutionary Acquisition (EA) Strategy.

3.1. EA Description. Evolutionary acquisition (EA) is a nontraditional, overarching acquisition strategy that a program can use to develop and field a core capability meeting a valid requirement with the intent to develop and field additional capabilities in successive increments. An increment is a distinct set of planned activities supporting the goal of delivering an operational capability to the user. The schedule delivery goal of each increment is 18 months or less.[1] Multiple, simultaneous increments may occur. The result of an EA strategy will be a continual evolution of a system toward fulfilling its overarching operational requirements with the ability to incrementally refine requirements and exploit opportunities as they arise. Evolutionary acquisition differs from a Pre-Planned Product Improvement (P^3I) acquisition strategy in that future increments are not definitively planned and baselined until the current increment is about to be executed.

3.2. EA Benefits. The simple goals of EA for C2 systems are to achieve modernization and deployment efficiently and quickly. Use of an EA strategy for C2 systems will deliver a core operational capability sooner by dividing a large, single development into many smaller developments or increments. EA allows a program to quickly respond to changing conditions by allowing each increment to accommodate the following three activities: 1) develop new capabilities supporting the operational requirements and goals of the system, 2) exploit opportunities to insert new technologies that reduce cost of ownership or accelerate fielding of new capabilities resulting from experimentation or technology demonstrations, and 3) refine current capabilities based on user feedback, testing, or experimentation.

3.3. Influence of Other Guidelines. Implementing the EA strategy requires substantial tailoring of the traditional acquisition milestones and phases in DoD 5000.2-R in order to accomplish C2 program goals. Evolutionary acquisition for C2 systems should use the guidance contained in the DoD Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Architecture Framework, Defense Information Infrastructure/Common Operating Environment (DII/COE), DoD Joint Technical Architecture (JTA), and Joint Technical Architecture-Air Force (JTA-AF). These documents guide C2 systems to evolve using a common information technology architectural construct and infrastructure.

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1. This goal considers Division E of Public Law 104-106, Title 52 Sec. 5202, (a) Sec 35 c(3), the Information Technology Management Reform Act of 1996.

4. Spiral Development Process.

4.1. Spiral Development Process Description. The activities within each increment are described as a spiral development process. The spiral development process is an iterative set of sub-processes that may include: establish performance objectives; design; code, fabricate, and integrate; experiment; test; assess operational utility; make tradeoffs; and deliver. Other sub-processes may be added as needed. Spiral development characteristics include: a team of stakeholders motivated to collaborate and mitigate risk; a development plan and decision process; a process to refine requirements; a firm schedule per increment; continued negotiation of performance and cost goals; test/experimentation; and a user decision to field, continue development, or terminate any portion of the increment. Experimentation, which includes simulation and exercises, allows all concept stakeholders to solidify their understanding of a concept beyond paper studies or ideas. When strung together, spirals facilitate more precise and rapid maturation of new technologies and refinement of user requirements with high operational utility into a complete capability for one increment. The key intent is for the system and the fidelity of its requirements to evolve together with iterative feedback. Feedback can originate from multiple sources including experiments, test and evaluation, the AF Modernization Planning Process (MPP), radio frequency management, operational experience, and user participation.

4.1.1. Use of Spiral Development. Spiral Development is intended to be the primary development methodology for two types of modernization activities: 1) Evolutionary Acquisition Programs, and 2) C2 and C2-related technology demonstrations and operational experiments. The goal of spiral development is to allow innovation in technology and operational concepts to occur simultaneously and continuously at many levels and across all functional lines. The result is operational requirements will evolve in parallel with system capabilities through an iterative process of idea generation, rapid prototyping, technology insertion, and operational testing.

4.1.2. Integrated Product Teams (IPT). Spiral development is executed through two main IPTs, the Integrated Command and Control System (IC2S) Spiral Development Task Force and the Spiral Development Integrated Product Team (SDIPT). The Aerospace Command and Control & Intelligence, Surveillance, and Reconnaissance Center (AC2ISRC), a lead Major Command (MAJCOM), or Program Manager creates and leads the IPTs. To form an effective IPT, members must be empowered, committed, representative, knowledgeable, and collaborative.

4.1.2.1. Integrated Command and Control System (IC2S) Spiral Development Task Force. The Integrated Command and Control System (IC2S) Spiral Development Task Force manages the spiral development of the integrated C2 system and coordinates all the efforts of SDIPTs associated with the sub-components of the C2 system. The IC2S Spiral Development Task Force will be created and led by the AC2ISRC.

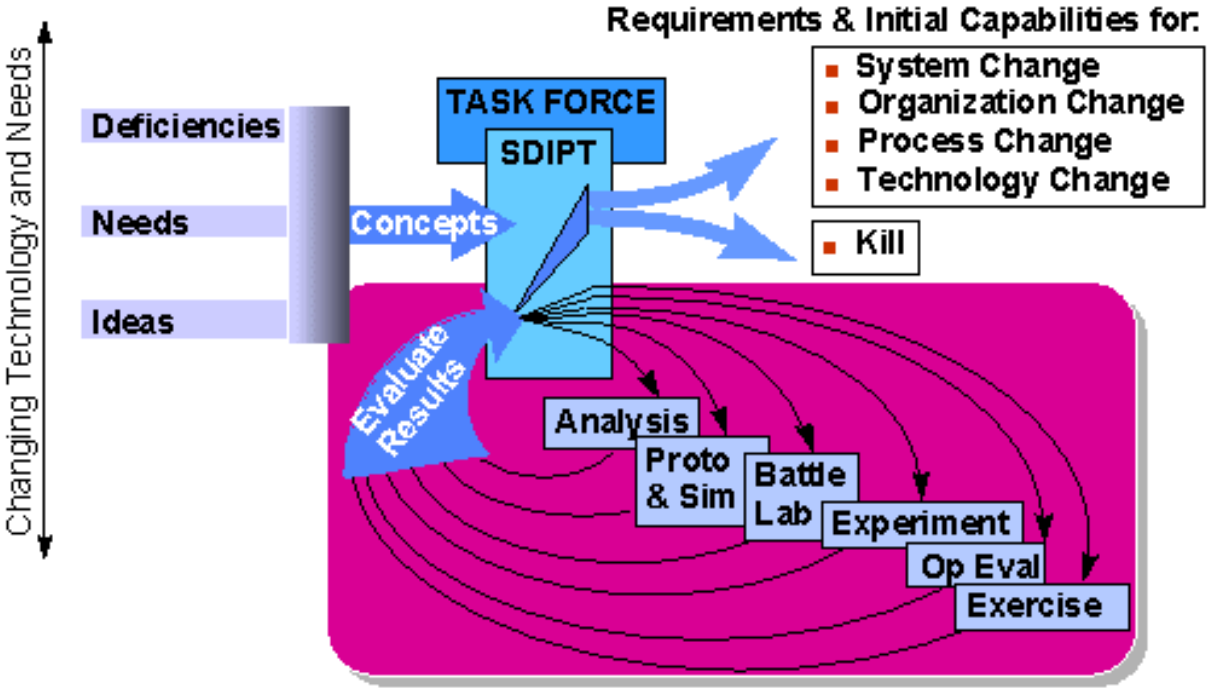
4.1.2.2. Spiral Development Integrated Product Team (SDIPT). The SDIPT drives the formal and derived evolutionary acquisition requirements and is responsible for managing the steps necessary to quickly field needed capabilities to the user. This may start with nurturing an innovative idea or method, to include proposing whether a materiel solution is needed, and continue with monitoring any subsequent results throughout its life cycle. Based on the results of any increment, the SDIPT may also initiate changes to any formal or derived requirements document. Within the framework outlined in the SAMP and approved by the MDA, team members will be responsible for making program recommendations to the SDIPT voting members. SDIPT voting members are those people designated and authorized to represent their area of expertise and form the core decision-making portion of the IPT. The team will

collaborate throughout an entire program life-cycle. The IPT should avoid changing membership, especially voting members, within one increment. As a minimum, the IPT will have voting members from the development, test, and user communities. Some communities may have more than one voting member; for example, developmental test and operational test communities may both have IPT voting members. Voting members from other areas of expertise may be added as needed. Other IPT members will execute tasks of the IPT by providing services, information, and recommendations to the IPT voting members.

4.1.3. Spiral Activity Areas. Spiral activities are grouped in three areas: Concept Development, Baseline Development, and Fielding and Operations. They normally occur in the sequence from Concept Development to Baseline Development and then Fielding and Operations. These activities may occur within one increment, in separate increments, overlap, or occur serially according to the plans of the Spiral Development IPT. For example, an upgrade to an existing system may proceed through Concept Development, Baseline Development, and operational fielding within one increment. The Spiral Development IPT will decide what activities to plan for an increment based upon the requirements, expected effort, remaining risks, funding available, and planned time to complete the increment.

4.1.3.1. Concept Development. Concept Development matures new concepts, ideas, and technologies into well-defined requirements and initial capabilities. These activities may be separate from a formal acquisition program. Concepts are generated out of operational needs or deficiencies, new technology opportunities, or innovative ideas. The concept, initially a general statement of an objective or hypothesis, is matured through any mix of analysis, rapid prototyping, experimentation, simulation, battlelabs, operational evaluation, and/or exercises as shown in Figure 1. The development process is managed by decisions to repeat, continue, or kill concept spirals and shall consider remaining risks, return on investment, and net benefit. Concepts are developed with operator “hands on” involvement early and often getting to the “test and fix” point quickly. In this area, the Spiral Development IPT takes ownership of a concept with strong leadership from the user. The IPT completes whatever activities are needed to mature a concept.

Figure 1. Concept Development - A Notional Spiral Development Process.



4.1.3.1.1. Concept Development Products. Products of this activity may include:

4.1.3.1.1.1. New or updated formal requirements identified in an Operational Requirements Document (ORD) or a Capstone Requirements Document (CRD).

4.1.3.1.1.2. New or updated derived requirements from documents such as an Operational Concept of Employment or a system capabilities description.

4.1.3.1.1.3. Proposals for organizational, tactics, training, or procedural changes.

4.1.3.1.1.4. Recommendations for funding changes.

4.1.3.1.1.5. Endorsements for further technology research.

4.1.3.1.1.6. Prototypes demonstrating a capability.

4.1.3.1.1.7. Fully developed and supportable end-items (leave behinds) suitable for limited implementation.

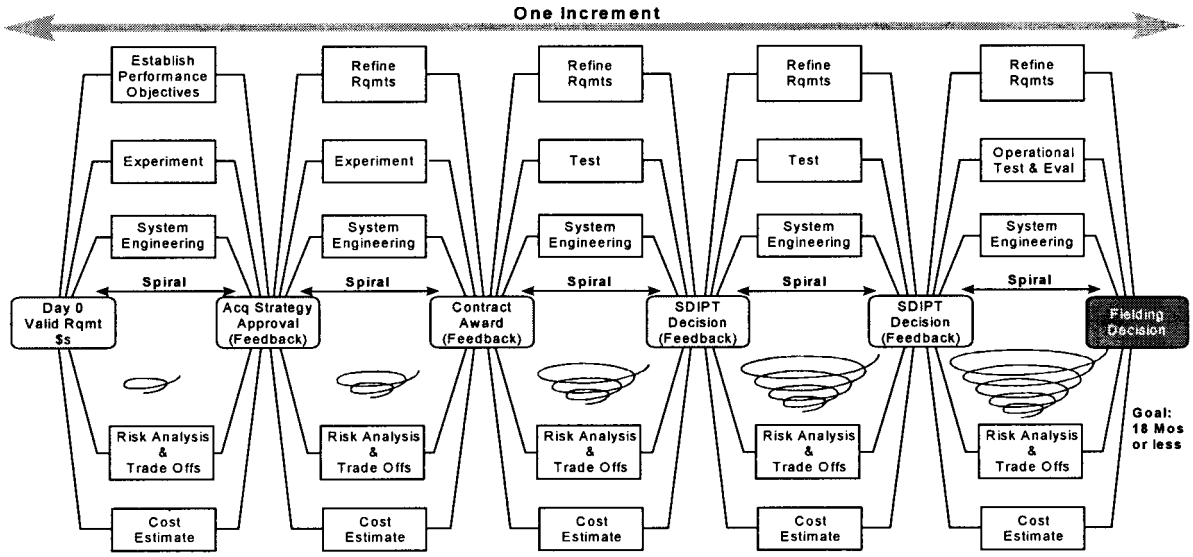
4.1.3.1.1.8. Decisions to cease further Concept Development.

4.1.3.1.2. Results with Materiel Solutions. If Concept Development is likely to result in a materiel solution such as a prototype or a leave behind, the IPT shall identify an existing acquisition organization that will incorporate the Concept Development results into their product baseline and provide support for the remaining life cycle. Identifying this acquisition organization early will help transition the concept to a fielded system and help identify any integration or interoperability constraints during Concept Development. During Concept Development, the SDIPT will contain at least one member from the target acquisition

organization. If a decision is made to proceed with a materiel solution, the SDIPT shall establish appropriate formal or derived requirements, identify resources needed for Baseline Development activities, and develop a plan to transition the technology into a fielded system. The transition plan should become part of the next Spiral Development Increment Plan (SDIP) for the baseline incorporating the Concept Development results.

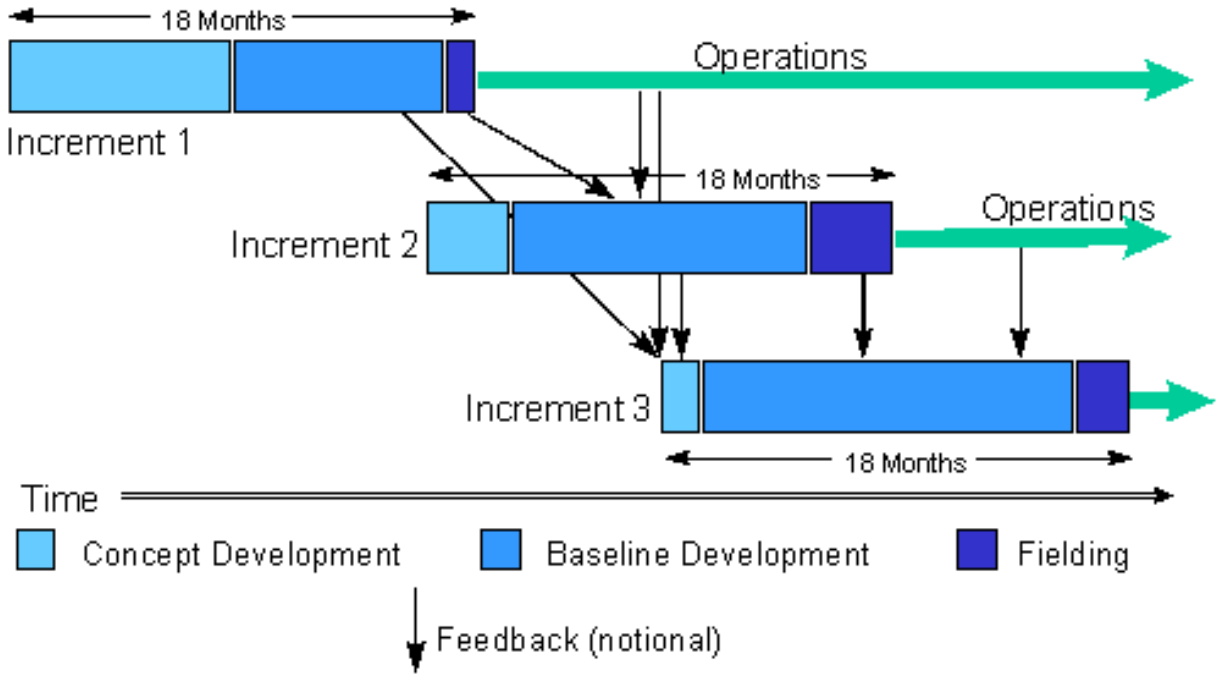
4.1.3.2. Baseline Development. Baseline Development begins with the requirements and capabilities developed during Concept Development and then refines, integrates, and tests them into a solution ready for fielding Air Force or multi-Service wide. These activities are part of a formal acquisition program. Acquisition organizations such as System Program Offices (SPO) will normally lead, manage and execute this activity with frequent user participation. Exceptions to SPO leadership will be documented in the Spiral Development Increment Plan. Baseline Development must include training of an appropriate number of users in anticipation of fielding fully supportable capabilities. As shown in Figure 2, Baseline Development concludes when the user accepts the results of the increment for fielding.

Figure 2. Baseline Development - A Notional Spiral Development Process.



4.1.3.3. Fielding and Operations. These activities include fielding the C2 subsystem from Baseline Development and then operating and supporting it throughout its remaining life span. These activities are part of a formal acquisition program. An initial portion of a system normally will be fielded with only the core capabilities of the envisioned final system. Simultaneously, subsequent increments may be in Concept and Baseline Development and will be added later to the operational system. Each increment builds upon or adds to previous capabilities, progressing toward an envisioned final state of the system. Feedback from the system operators is used to improve or change upcoming increments or may alter the envisioned final state of the system. Figure 3 shows the fielding at the conclusion of three notional increments.

Figure 3. Fielding and Operations - A Notional Set of Increments.



4.1.4. Spiral Development Process. Figure 2 depicts a notional spiral development process within one EA increment containing only Baseline Development activity. During the sub-processes, the user should receive and provide constant feedback. The SDIPT uses information resulting from these sub-processes identified in Figure 2 (Acquisition Strategy, Contract Award, and Feedback Points) to make program decisions concerning requirements, cost, schedule, and technology maturity assessments. The focus is to mature the current increment by proceeding through spirals and producing a capability suitable for Fielding and Operations.

4.1.4.1. Planning . The Spiral Development IPT will accomplish planning for all increments. As one increment concludes, planning for the next increment should be nearly complete, and planning for the remaining increments throughout the FYDP should be updated. The definition of future increments will be less and less specific as they approach the end of the FYDP. As the program progresses through its series of increments, the content and funding of future increments are continuously refined until a definitive baseline is ready to begin Baseline Development. The IPT will carefully take into account test results and lessons learned from previous increments. Each new increment should operate independently and not affect the previous baseline in adverse ways. Also, the IPT will carefully consider backward compatibility with previous increments to meet interoperability requirements.

4.1.4.2. Schedule. The total capability identified in formal requirement documents is not normally satisfied in one increment. System development may progress through numerous successive increments each with more mature operational concepts or better fielded capabilities. The results of the first increment will provide a basis for future increments. The overall target schedule for the series of increments, including when Key Performance Parameters (KPP) and

a core capability should be met, shall be documented in the Single Acquisition Management Plan (SAMP) or the Acquisition Plan (AP). The schedule goal for periodic deliveries is 18 months or less. This time shall begin when validated requirements and funding are available and ends no earlier than the time the user makes a fielding decision. This goal normally applies to Baseline Development, but other activities may be included.

4.1.4.3. Feedback and Decision Points. Spiral development results in constant feedback among developers, testers, and users. The decision points shown in Figure 2 are not mandatory, but show a representative spiral development flow. Actual spiral developments may have a different number of decision points, may have simultaneous decision points, or may change the order of decision points. The intent is to use current information to obtain frequent feedback for making program decisions. This matures the increment towards high quality, supportable systems that meet user's needs within timely schedules. The decisions from these feedback events are documented in a Spiral Development Decision Memorandum (SDDM) which is approved by all SDIPT voting members. When IPT voting members are unable to reach a decision, the issue will be elevated to the Milestone Decision Authority (MDA) for resolution. If the IPT recommends modifying the Acquisition Program Baseline (APB), the IPT will forward a revised APB to the Program Manager (PM) for review/approval. If the PM agrees with APB revisions, the PM shall forward it to the MDA for approval according to DoD 5000.2-R.

4.1.4.4. Fielding. At the conclusion of any increment completing Baseline Development activities and with the approval of the MDA and the recommendation of developers and testers, the user shall decide readiness to accept each incremental capability for fielding. An independent operational test report and fielding recommendation will support all increment fielding decisions by the MDA and user. Typically, AC2ISRC or MAJCOM test organizations will conduct Force Development Evaluation (FDE) to support operational fielding decisions. The developer, under the user's guidance, may field part or all of the functionality developed during an increment depending on tested operational effectiveness, interoperability with previously fielded systems, or radio frequency supportability. Fielding includes qualification training for sufficient users to employ the end-item as envisioned in an approved Operational Concept of Employment. Fielding also includes sufficient support in place to fix failures and maintain fielded items. The initial fielding establishes a system flexible architecture (backbone) and provides the operator hands-on experience to better determine what to incorporate in future increments. This includes basic hardware, system software and tools, network upgrades, and fundamental applications.

4.1.4.4.1. Pre-Core Increments. Some increments may be fielded prior to fielding the core capability to provide a means for user feedback and help refine requirements. These pre-core increments may be fielded to at least one location but no more than 10% of the planned fielding locations. Exceeding this limit requires approval of the MDA.

4.1.4.4.2. Core and Post-Core Increments. All increments that deliver the core capability will complete dedicated Operational Test & Evaluation (OT&E). All core and post-core increments may be fielded to 100% of the planned fielding locations.

4.1.4.5. Configuration Control. The single manager maintains the configuration baseline throughout a system life-cycle. The developer will ensure systems under development comply

with the configuration baseline. Users will ensure fielded systems remain compliant with the configuration baseline or coordinate baseline changes with the single manager.

4.2. Documentation. The Air Force Strategic Plan and C2 Roadmap identify the long-range goals of the C2 mission area. The capstone requirements document establishes the scope of the entire integrated C2 system. The Operational Requirements Document (ORD) establishes the scope of each particular C2 subsystem being acquired. As applicable, the APB, milestone exit criteria, and Acquisition Decision Memorandum (ADM) will reflect key milestone events that must be met. Collectively, these documents describe the overarching requirements and goals of the EA. The resulting acquisition approach to satisfy these requirements are outlined in the SAMP or AP, detailed in individual SDIPs, and documented in SDDMs.

4.2.1. Acquisition Program Baseline (APB). An Evolutionary Acquisition approach requires a tailored approach to manage APBs. For Baseline Development and Fielding & Operations activities, SDIPTs will develop APBs that specify the end state goals for cost, schedule and performance goals for the overall program and for each increment. APBs shall document the results of the planning process described in paragraph 4.1.4.1. All APBs for the next increment to be executed will be approved by the MDA. Planning APBs for out year increments will be submitted to the MDA but do not require approval. All incremental APBs should be submitted with the SDIP for each increment. The overall program APB will:

4.2.1.1. Document which increment(s) will satisfy which KPPs.

4.2.1.2. Specify the minimum performance parameters, including KPPs, that define the core capability and target which increment will provide the core capability.

4.2.2. Single Acquisition Management Plan (SAMP) or Acquisition Plan (AP). Once the decision is made to use an EA strategy for Baseline Development, the SDIPT will document the decision in the SAMP or AP and describe how EA for a particular C2 subsystem will be executed. The plan for new subsystems will provide more detail on the first increment. The SAMP or AP may have annexes to accommodate increment-unique plans requiring MDA approval. Increment-unique plans not requiring MDA approval should be placed in the SDIP. The SAMP or AP will:

4.2.2.1. Outline the plan for milestone decisions and OT&E.

4.2.2.2. State prerequisites for starting and ending increments.

4.2.2.3. Outline the plans for transitioning new technology into the acquisition program.

4.2.2.4. Estimate preliminary cost and schedule for at least six years (or to completion) for planning and budgeting purposes.

4.2.2.5. Identify the organizations to provide voting members of the SDIPT for the first increment, as well as the Program Executive Officer (PEO) or Designated Acquisition Commander (DAC), and MDA for the corresponding acquisition level.

4.2.2.6. Address who will be involved in making decisions and focus on delegating decisions to the lowest appropriate level based on the complexity and level of risk associated with the particular C2 subsystem.

4.2.2.7. Outline the process and identify the process owner to develop and maintain the C4I Support Plan.

4.2.2.8. If required, outline a frequency management support process for radiating and receiving devices in accordance with AFI 33-118, *Radio Frequency Spectrum Management*.

4.2.2.9. Include other items as needed. See *Single Acquisition Management Plan Guide.*

4.2.3. Concept Development Plan (CDP). If no SAMP or AP exists to guide the SDIPT with overall program objectives during Concept Development activities, the SDIPT will create and approve a Concept Development Plan to establish the overall project objectives for developing a single concept or set of related concepts. This plan will identify those activities needed to mature concepts into a suitable product; outline a decision process that focuses on repeating, continuing, or killing concept spirals; identify the SDIPT leader and members by organization; and estimate preliminary cost and schedule for at least six years (or to completion) for planning and budgeting purposes. For concept developments that are likely to result in material solutions, the CDP shall outline a plan to transition technology into a fielded system including risks and estimated costs.

4.2.4. Spiral Development Increment Plan (SDIP). For each increment, the SDIP will distinctly outline the plan to satisfy the goals of a specific increment. The SDIPT will prepare and approve the SDIP, and forward a copy to the Milestone Decision Authority (MDA). Objectives shall include resources and schedule needed to satisfy the requirement. The SDIP should also consider the trade space between the thresholds and objectives of ORD performance parameters. The SDIP, generally not more than five pages, will be consistent with the ORD and the SAMP or AP. The SDIP will:

4.2.4.1. State the goals of the increment.

4.2.4.2. Identify by name the SDIPT voting members.

4.2.4.3. Outline the SDIPT's process for making decisions concerning requirements refinement, cost, schedule, supportability, and SDIP updates.

4.2.4.4. Outline how the SDIPT will provide timely reports on program progress to meet cost, schedule, and performance goals.

4.2.4.5. Focus on delegating decisions to the lowest appropriate level based on the complexity and risk associated within the increment.

4.2.4.6. Define the level of operational testing. The core capability will undergo dedicated Initial Operational Test & Evaluation (IOT&E).

4.2.4.7. Identify and plan for technology transition into the existing baseline from Concept Development, sustaining engineering, or other activities.

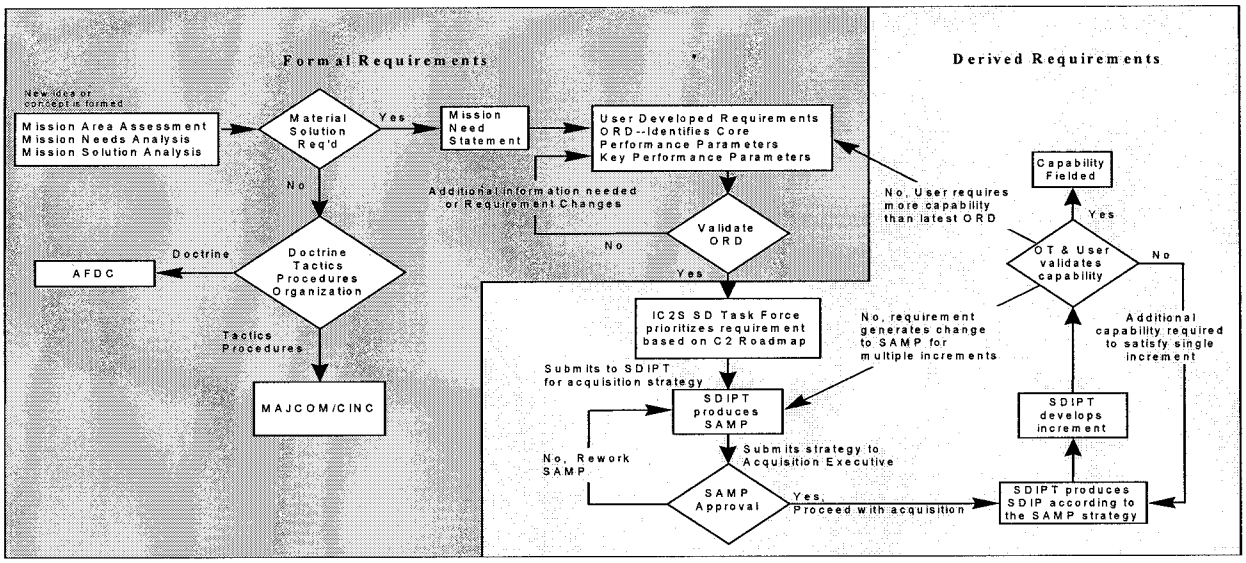
4.2.4.8. Include other items as needed.

4.2.5. Spiral Development Decision Memorandum (SDDM). The SDDM will document the decisions and results of each spiral within an increment. SDIPT voting members will sign the SDDM for approval. In the event the IPT voting members are unable to reach a decision, the issue will be elevated to the Milestone Decision Authority (MDA) for resolution. For increments containing Baseline Development, at least one SDDM will include certification by Program Executive Officer (PEO) or Designated Acquisition Commander (DAC) that the increment is ready for dedicated Operational Testing in accordance with AFMAN 63-119. Also, at least one SDDM will document the user's decision of which increment results are and are not acceptable to the user for fielding.

4.3. Requirements Management.

4.3.1. Formal Requirements. Evolutionary acquisition for C2 systems shall conform to high level end-state requirements documented in the Air Force (AF) C2 Roadmap, AC2ISRC's Campaign Plan, Capstone Requirements Documents (CRD), and Operational Requirements Documents (ORD). As needed, these formal documents shall be refined as the system evolves. At the time of staffing, the initial ORD or CRD will identify the overall concept and required capability to satisfy the deficiency identified in the Mission Need Statement. Appropriate AF senior leaders will validate user-defined performance parameters and KPPs following AFI 10-601, *Mission Needs and Operational Requirements Guidance and Procedures*, and CJCSI 3170.01, *Requirements Generation System*. Operational Requirements Documents for an EA strategy will identify the system performance measures and characteristics for the entire system. Each increment will be a step in the direction toward the overall concept and capability described in applicable ORDs. As shown in Figure 4, the Spiral Development IPT, headed by the AC2ISRC or a lead MAJCOM, will usually be responsible for developing and interpreting formal requirements. Users will ensure requirements are stated in performance-based operational terms (what the system must do) rather than stated as specifications or engineering design goals (how the capability is achieved). Focusing on the capability required provides the necessary flexibility in the development process to meet the user's needs with the latest technologies and evolve the solution to meet the needed capability.

Figure 4. Requirements Process – A Notional Process for One Increment.



4.3.2. Derived Requirements. Using established formal requirements and following current policy and guidance, the SDIPT will synthesize derived requirements, assess the alternatives for meeting the requirements considering the current state of technology and cost, and then establish the goals for each increment. The SAMP will outline life-cycle subsystem goals, and successive SDIPs will detail goals for each increment. The SDIPT will update the acquisition strategy in the SAMP as necessary when ORD thresholds and objectives are better understood or as technology

matures. In the SDIP, the SDIPT shall define and prioritize detailed derived requirements before and during each increment.

4.3.3. Requirements Traceability. Trading off requirements within or between increments requires continuous knowledge and documentation of requirements. SDIPTs shall establish a system to trace requirements throughout the subsystem life-cycle.

4.4. Execution of Evolutionary Acquisition and Spiral Development Efforts.

4.4.1. Contracting. After the SDIP is signed, the SDIPT will implement the acquisition strategy to field the capability identified for the current increment. The appropriate contracting strategy depends on the particular requirement. Contracting Officers and Program Managers should use modular contracting[2] as stated in the Federal Acquisition Regulation (FAR) Part 39.103 whenever practicable to allow technology insertion. When appropriate, other nontraditional contracting approaches can be used to further enhance efficient and effective development efforts. Other nontraditional contracting approaches include Cooperative Research and Development Agreements (CRDA) under the Domestic Technology Transfer program (AFPD 61-3) and "other transactions" (non-FAR contracts) authorized for certain Air Force research and prototype projects under Section 845 of the FY 94 National Authorization Act, as amended by Section 804 of the FY 97 National Defense Authorization Act. Quick and efficient implementation of the selected contracting approach is key to successful execution of each spiral development increment within the goal of 18 months or less.

4.4.2. Funding. Quick acquisition of C2 capabilities requires available financial resources for quick transition from Concept Development to Baseline Development using an Evolutionary Acquisition strategy. The Planning, Programming, and Budgeting System (PPBS) resource allocation process requires defined, defensible programs in the Future Years Defense Plan (FYDP); however, the dynamic nature of technology and requirements precludes precise projection of all C2 projects in the later FYDP years. The corporate Air Force recognizes it must both maintain an effective PPBS resource allocation process and establish a financial environment that supports a more responsive acquisition process for C2 capabilities.

4.4.2.1. To provide more funding flexibility for significant changes and emerging C2 capabilities, SAF/AQ will create a transition funding strategy to address changes that cannot be absorbed within the next few increments. Funds for the transition will be distributed to C2 programs based on a prioritized list created by the AC2ISRC in collaboration with applicable lead MAJCOMs. The funds will only be available for the first two years of the funding need. During the two-year period, the AC2ISRC or lead MAJCOM must budget to provide the additional funding needed to continue program development and sustainment.

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[2] Mandated by Division E of Public Law 104-106, Title 52 Sec. 5202, (a) Sec 35, the Information Technology Management Reform Act of 1996.

4.4.2.2. To provide funding flexibility for small changes from new technology applications, Program Managers should allocate a portion of their funding stream to sustaining engineering. These funds will be used to insert small-scale technology enhancements into the existing baseline that increase combat capability or decrease cost of ownership. For example, a network-based subsystem may upgrade data flow capability from 10 Mbps to 100 Mbps or a computer subsystem may add more memory.

4.4.2.3. Program Managers (PM) may use multiple appropriations within one increment. For example, one increment may use Research, Development, Test & Evaluation (RDT&E) funds to develop new capability, use Operations and Maintenance (O&M) funds to fix problems from previous increments, and use Procurement funds to purchase hardware. In this environment, PMs should be more aware of the restrictions attached to each type of appropriation and should segregate work in the contract by correct appropriations. PMs should consult financial management personnel anytime there is a question on the proper use of an appropriation for a specific task.

4.4.3. Risk Management. SDIPTs will use an Integrated Product Team approach bringing together users, developers, testers, and other stakeholders in an effort to reduce the risk associated with starting and continuing programs. By building a required capability in increments, with a user-led SDIPT, the risk of fielding an ineffective, unsuitable, or unwanted product is reduced. The SDIPT will establish the contents of each increment, including the spirals within each increment, by considering the nature of the most critical remaining risks. If the primary remaining risks concern the nature of the user interface, for example, the increment or spiral should focus on user interface prototyping. If the primary risks involve Commercial-Off-The-Shelf (COTS) interoperability or scaleability, the increment or spiral should address those issues. Particularly for rapid development, it is appropriate for an increment to include several concurrent spirals addressing clusters of risk items. In this case, integration becomes important. Integration should be addressed via such techniques as well-documented operational concepts of employment, strategic plans, and operational architectures. In times of national emergency, the user may need to accept more known risks when a system or software module is provided quickly.

4.4.4. Radio Frequency (RF) Management. No radiating or receiving devices can legally operate without radio frequency certification. If a C2 system will radiate or receive radio frequency energy, Program Managers shall obtain proper authorizations in accordance with AFI 33-118. This includes application for equipment frequency allocation (DD Form 1494). Because authorization approvals may take 2-4 years in the international environment, the SDIPT shall consider frequency management early in a system life-cycle.

4.5. Test and Evaluation (T&E). The primary functions of T&E are to provide information and feedback to users, developers, and decision makers regarding system maturity, program risk, system standardization, functionality, and operational effectiveness and suitability. Testing during Concept Development is conducted on a structured, but less formal basis. The central vehicle for conducting all T&E activities will be the Combined Test Force (CTF). The CTF will coordinate with the Joint Interoperability Test Command (JITC) to determine if dedicated certification will be needed to validate technical compliance with compatibility, interoperability, and integration standards. If so, the CTF will support JITC testing, including needed funding, to certify compliance prior to system deployment. Also, the CTF will coordinate with the Air Force Information Warfare Center (AFIWC)

to determine the appropriate level of Information Assurance (IA) T&E. For concepts that have been selected for transition into baseline development, the target acquisition program's CTF shall participate in the Concept Development SDIPT to influence and leverage the test data collected during Concept Development and minimize the amount testing required during Baseline Development.

4.5.1. Test Agencies. The SDIPT will nominate a Responsible Test Organization (RTO) to lead the CTF and forward it to HQ AFMC/DO for approval. Air Force Operational Test and Evaluation Center (AFOTEC) or an AF/TE-approved organization will serve as the Operational Test Agency (OTA) for the CTF. Other CTF members may include the program office, users, and developing contractor. The RTO will consider the cost and benefits of government-conducted, contractor-conducted, or a mix of these when selecting members for DT. AC2ISRC or appropriate MAJCOM test organization will normally plan and conduct Force Development Evaluation (FDE) of USAF C2 systems to support operational fielding recommendations and, with agreement with AFOTEC, may perform Initial Operational Test & Evaluation (IOT&E), Qualification OT&E (QOT&E), or Follow-on OT&E (FOT&E) of C2 systems.

4.5.2. Test Activities. The RTO will lead combined Contractor Test/Developmental Test/Operational Test (CT/DT/OT) activities so as to ensure that CT/DT and OT objectives are not compromised. The CTF will measure and report system progress towards meeting user requirements and technical specifications. The OTA will incorporate operational test objectives into CT/DT/OT activities to the maximum extent feasible, in order to detect and correct system deficiencies as early in the development process as possible. The program office will document traceability linking operational requirements to individual hardware and software configuration items. The OTA, in conjunction with users, will document traceability linking operational requirements to mission essential tasks. Traceability will provide a means to infer mission capability (i.e., which tasks can be completed) based on hardware and software functionality verified during activities. The RTO will compile and write the CTF test plan and report, with inputs from all other CTF members. However, for operationally representative test activities (usually the final CT/DT/OT activity in a given increment) and any necessary dedicated operational testing, the OTA will compile and write an independent test and evaluation report containing a recommendation for system deployment. If other CTF members disagree with any report conclusions, they may submit a separate report through their chain of command. The AC2ISRC or MAJCOM test organization may perform FDEs and write a report. FDEs do not supplant AFOTEC's role in formal OT&E of the C2 system. As part of CTF activities, FDEs will be integrated with and may run concurrently with IOT&E, QOT&E, or FOT&E. For a comprehensive list of CTF roles and responsibilities, the RTO will develop and coordinate a charter with all CTF members prior to any CT/DT/OT activities for a given system.

4.5.3. Situations Where Formal AFOTEC OT&E May Not Be Required. Some ACAT III C2 systems suitable for rapid fielding may not require a formal IOT&E, QOT&E, or FOT&E and may proceed directly into FDE. For these systems, AC2ISRC or other MAJCOM test organizations will develop Memorandums of Agreements (MOA) with AFOTEC describing decision criteria and thresholds for allocating C2 systems to the AC2ISRC or MAJCOM test organization for FDE. Requests to modify OT&E requirements are required for ACAT I, ACAT II, and all ACAT III C2 systems not covered by MOA. Submit requests to modify OT&E requirements to AFOTEC/XO and AF/TEP according to AFI 99-102. These requests will briefly:

4.5.3.1. Describe the system and its purpose.

4.5.3.2. Outline the justification for the waiver including urgency of need.

4.5.3.3. Describe what testing will be done in lieu of AFOTEC-led OT&E.

4.5.3.4. Provide points of contact.

4.5.3.5. Include other items as needed.

5. Organizational Roles And Responsibilities.

5.1. SAF/AQ will:

5.1.1. Support evolutionary acquisition using the spiral development process for C2 systems to rapidly equip warfighters with effective and affordable systems.

5.1.2. Create and implement a transition funding strategy to address significant changes and emerging capabilities of C2 subsystems that cannot be absorbed within existing increments.

5.2. Program Executive Office (PEO) and Designated Acquisition Commander (DAC) will:

5.2.1. Ensure PMs for C2 programs within their portfolio implement acquisition strategies that include EA principles and the spiral development process, except for those programs where the user and MDA jointly agree not to use an EA strategy.

5.2.2. Certify systems or subsystems are ready to begin dedicated OT&E according to AFMAN 63-119.

5.3. Milestone Decision Authority (MDA) will:

5.3.1. Ensure SAMPs or APs for C2 programs include EA principles and the spiral development process, except for those programs where the user and the MDA jointly agree not to use an EA strategy.

5.3.2. Review SDIPs.

5.3.3. In coordination with the AC2ISRC or lead MAJCOM, make fielding decisions.

5.3.4. Approve all Acquisition Program Baselines (APB).

5.4. Aerospace Command and Control & Intelligence, Surveillance, and Reconnaissance Center (AC2ISRC) will:

5.4.1. In coordination with the MAJCOMs, develop and advocate an integrated C2 Program Objective Memorandum (POM) input. This includes transition funding and funding for program development and sustainment after transition funding has expired.

5.4.2. Propose and advocate sustaining engineering and technology insertion funding.

5.4.3. Ensure transition funding is available on an annual basis to allow technology insertion efforts to go immediately from a validated requirement into Baseline Development. In coordination with the MAJCOMs, AC2ISRC will approve the prioritized efforts to be executed. Prior to approval, this transition funding will not be dedicated to any existing program.

5.4.4. In accordance with the SAMP, AP, or Concept Development Plan, create and lead Spiral Development IPTs conducting Concept Development activities. Create and lead the IC2S Spiral Development Task Force. Provide representatives for all SDIPTs, as required.

5.4.5. In coordination with the MDA, make operational fielding decisions for programs under their purview based on fielding recommendations from AFC2TIG.

5.5. MAJCOM/Lead Command will:

5.5.1. Propose and advocate sustaining engineering and technology insertion funding.

5.5.2. In coordination with the AC2ISRC, prioritize transition efforts to be executed.

5.5.3. In accordance with the SAMP, AP, or Concept Development Plan, create and lead Spiral Development IPTs conducting Concept Development activities. Provide representatives for all SDIPTs, as required.

5.5.4. Provide representatives for the IC2S Spiral Development Task Force.

5.5.5. Develop a C2 POM and budget requirements in collaboration with AC2ISRC.

5.5.6. Establish appropriate continuation training for fielded systems.

5.5.7. In coordination with the MDA, make operational fielding decisions for programs under their purview.

5.6. IC2S Spiral Development Task Force will:

5.6.1. Coordinate the efforts of all SDIPTs to reduce duplication among C2 subsystems.

5.6.2. Prioritize the AC2ISRC's spiral development efforts to be executed.

5.6.3. Conduct assessments of the entire IC2S to identify duplication among C2 subsystems.

5.6.4. Monitor development of the IC2S operational and system architectures.

5.7. Spiral Development Integrated Product Team will:

5.7.1. Manage development of a C2 subsystem as directed by AC2ISRC, lead MAJCOM, or Program Manager.

5.7.2. Develop and approve SDDMs.

5.7.3. Collaborate throughout the entire program life-cycle as needed.

5.7.4. Define and prioritize requirements for the follow-on increment during the current increment considering the most critical remaining risks.

5.7.5. Identify user-accepted delivery points that allow for fielding of an acceptable increment of capability while EA continues toward development of the full capability.

5.7.6. Assess manpower, training, and C4I support planning requirements for each fielded capability during subsystem development.

5.7.7. Develop and approve SDIPs and forward to the MDA.

5.8. Program Manager will:

5.8.1. Be responsible for execution of the Evolutionary Acquisition (EA) strategy.

5.8.2. Use a spiral development process within the EA development of a C2 requirement.

5.8.3. Prioritize and recommend specific activities for the spiral development efforts to be executed considering the most critical development risks remaining.

5.8.4. Prepare and submit SAMPs and APs for approval.

5.8.5. Create and lead SDIPTs conducting Baseline Development activities. Provide representatives for all SDIPTs, as required.

5.8.6. Ensure all test requirements are efficiently integrated using a Combined Test Force approach.

5.8.7. Prior to fielding, ensure sufficient training is complete to fulfill approved Operational Concepts of Employment and sufficient support in place to fix failures and sustain the system.

5.8.8. Incorporate information assurance and network security to ensure C2 systems are fielded with the proper AF security considerations, including certification and accreditation in accordance with AF System Security Instruction 5024.

5.8.9. Obtain proper radio frequency authorizations for radiating or receiving devices in accordance with AFI 33-118.

5.9. Test Organizations:

5.9.1. AFOTEC, as Operational Test Agency, will:

5.9.1.1. Provide representatives for SDIPTs and actively participate in CT/DT/OT activities.

5.9.1.2. Lead operationally representative CT/DT/OT activities (usually the final test activity prior to system deployment), including writing a test report prior to system (or subsystem) deployment. The report will include a recommendation for subsystem deployment.

5.9.1.3. Conduct dedicated OT&E, unless waived by AF/TE, on the core increment and as required on other increments.

5.9.1.4. Create a traceability matrix linking operational requirements to mission essential tasks.

5.9.2. Responsible Test Organization will:

5.9.2.1. Lead CT/DT/OT activities, except for dedicated OT events.

5.9.2.2. Write a test plan and report for each CT/DT/OT activity, except for dedicated OT events.

5.9.2.3. Write a Combined Test Force charter describing roles and responsibilities for each member as well as providing a general outline of CT/DT/OT activities.

5.9.3. AC2ISRC or MAJCOM test organizations will: conduct FDEs or other tests as directed, agreed to in other instructions, or waived according to paragraph 4.5.3.

5.9.4. Combined Test Force will: Measure and report system progress toward meeting the technical and operational aspects of the ORD's requirements. Ensure test requirements for JITC certification are incorporated into CTF test events.

5.10. Product Centers, Air Logistics Centers, and Research Sites will: Provide the processes, procedures, and contract vehicles to accommodate EA and spiral development.

LAWRENCE J. DELANEY
Assistant Secretary of the Air Force (Acquisition)

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

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AFI 33-118, Radio Frequency Spectrum Management

AFI 99-101, Developmental Test and Evaluation

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Abbreviations and Acronyms

AC2ISRC—Aerospace Command and Control & Intelligence, Surveillance, and Reconnaissance Center

ADM—Acquisition Decision Memorandum

AF—Air Force

AFDC—Air Force Doctrine Center

AFMC—Air Force Materiel Command

AFOTEC—Air Force Operational Test and Evaluation Center

AP—Acquisition Plan

APB—Acquisition Program Baseline

C2—Command and Control

C4ISP—Command, Control, Communications, Computers, and Intelligence Support Plan

C4ISR—Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance

COTS—Commercial-Off-The-Shelf

CRD—Capstone Requirements Document

CRDA—Cooperative Research and Development Agreement

CTF—Combined Test Force

CT/DT/OT—Contractor Test/Developmental Test/Operational Test

DAC—Designated Acquisition Commander

DII-COE—Defense Information Infrastructure-Common Operating Environment

DT&E—Developmental Test & Evaluation

EA—Evolutionary Acquisition

FAR—Federal Acquisition Regulation

FDE—Force Development Evaluation

FOT&E—Follow-On Operational Test & Evaluation

GOTS—Government-Off-The-Shelf

IA—Information Assurance

IC2S—Integrated Command and Control System

IC2SSDTF—IC2S Spiral Development Task Force

IOT&E—Initial Operational Test & Evaluation

IPT—Integrated Product Team

ITMRA—Information Technology Management Reform Act

JITC—Joint Interoperability Test Command

JTA—Joint Technical Architecture

JP—Joint Publication

KPP—Key Performance Parameter

MAA—Mission Area Assessment

MAP—Mission Area Plan

MBps—Mega Bits Per Second

MDA—Milestone Decision Authority

MNA—Mission Needs Analysis

MNS—Mission Need Statement

MSA—Mission Solution Analysis

ORD—Operational Requirements Document

OTA—Operational Test Agency

OT&E—Operational Test and Evaluation

PE—Program Element

PEO—Program Executive Officer

PM—Program Manager

PMD—Program Management Directive

POM—Program Objective Memorandum

PPBS—Planning, Programming, and Budgeting System

RDT&E—Research, Development, Test & Evaluation

RF—Radio Frequency

RTO—Responsible Test Organization

SAE—Service Acquisition Executive

SAMP—Single Acquisition Management Plan

SDDM—Spiral Development Decision Memorandum

SDIP—Spiral Development Increment Plan

SDIPT—Spiral Development Integrated Product Team

TEMP—Test and Evaluation Master Plan

Terms

Acquisition Plan (AP)—A comprehensive plan documenting the overall strategy for managing the acquisition.

C2 Mission Area Plan (MAP)--Collaborative AC2ISRC construct which includes a C2 Roadmap and investment strategy that incorporates programs necessary to integrate aerospace C2, eliminate duplication of effort, and drive towards commonality. The MAP is written by mission area teams representing Air Force “user” commands, AFMC, and when required, National Laboratories and independent R&D efforts

of academic institutions and industry. It comprises a system/capability roadmap outlining a modernization plan and descriptions of critical enabling technologies contributed by science and technology programs developed to correct task deficiencies.

C2 Roadmap--A planning document which incorporates programs necessary to integrate air and space C2, eliminate duplicative effort, and drive towards commonality. The Roadmap is used to produce the AC2ISRC POM input submitted to the Air Force Corporate Structure.

C2 System--The facilities, equipment, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned. (JP 1-02) Equipment includes hardware, firmware and software.

Combined Test Force--An integrated Test & Evaluation product team empowered to evaluate a weapon system by collecting its major members at one primary test site. The requirements, resources, test objectives, and leadership of various test efforts are integrated to achieve higher levels of efficiency. As a minimum, representatives from the all test communities, contractors, and operating commands will be members. (AFI 99-102)

Combined Testing--Testing conducted by the developmental and operational testers to achieve cost and schedule advantages. The high cost or lack of sufficient test articles provides a great incentive for all test teams to share test resources and data. Combined testing usually ends with a phase of dedicated OT&E.

Cooperative Research and Development Agreement--Any agreement between one or more Air Force RDT&E activities and one or more of the following parties: other Federal agencies; units of state or local government; for profit organizations (including corporations, partnerships, limited partnerships, and industrial development organizations); public and private foundations; nonprofit organizations (including universities); or other persons (including licensees of inventions owned by the Federal agency). Under these agreements, the Air Force, through its RDT&E activities, may provide personnel, services, facilities, equipment, intellectual property, or other resources (but not funds) with or without reimbursement. One or more of the non-Air Force partners may provide personnel, services, facilities, equipment, intellectual property, or other resources (including funds) towards the conduct of specified research or development efforts consistent with the missions of the laboratory. NOTE: This term does not include a contract or cooperative agreement as used in 31 U.S.C. 6303, 6304, and 6305.

Core Capability--The critical mass of standalone capability defined in the SAMP which undergoes dedicated IOT&E. The core capability will provide the initial full-fielding operational capability and the basic backbone infrastructure necessary to support ensuing incremental mission functional growth. The core consists of basic hardware, system software, and fundamental applications. Normally the first increment will contain the core capability; however, other increments may be fielded before the core capability.

Defense Information Infrastructure (DII) Common Operating Environment (COE)--The DII COE is an architecture that is fully compliant with the DoD Technical Architecture for Information Management (TAFIM), Volume 3; an approach for building interoperable systems; a reference implementation containing a collection of reusable software components; a software infrastructure for supporting mission area applications; and a set of guidelines, standards, and specifications.

Derived Requirements--Those sub-requirements that flow from formal requirements. SDIPTs will establish derived requirements that should be completed in order to fulfill formal requirements.

Developer--Any organization or individual from System Program Offices or contracted organizations (both military and civilian) with a responsibility to acquire or develop all or part of a system.

Evolutionary Acquisition (EA)--An acquisition strategy whereby a basic capability is fielded with the intent to develop and field additional capabilities as requirements are refined. The key concept is to rapidly develop and field useful increments of capability (goal of 18 months or less for each delivery of an incremental capability), and to leverage user feedback in refining required capabilities for additional increments.

Fielding--The action of incorporating completed development end-items to the locations where they are intended to operate. Fielding includes training for sufficient users to employ the end-item as envisioned in an approved Operation Concept of Employment. Fielding also includes sufficient support in place to fix failures and maintain the fielded items.

Fielding Decision--A user decision that documents which portion of functionality developed during an increment is suitable for fielding.

Force Development Evaluation (FDE) for C2 Systems--The evaluation, demonstration, exercise, or analysis of fielded, operational systems. FDE may support MAJCOM user/tester evaluation decisions concerning operational employment, fielding, or system standardization. This testing will be integrated with the IOT&E, QOT&E, or FOT&E testing through the CTF. See AFI 99-102.

Formal Requirements--Those requirements that are created through established mandatory processes, for example the ORD process. Formal requirements provide the foundation for SDIPTs to derive sub-requirements.

Increment--An increment is a distinct set of planned activities supporting the goal of delivering an operational capability to the user. Except for the first increment, each increment builds upon the capabilities of previous increments. Can also refer to the product of an increment as in the statement "Those capabilities will be provided in the next increment."

Information Assurance--Information Operations that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and nonrepudiation. This includes providing for restoration of information systems by incorporating protection, detection, and reaction capabilities. (JP 1-02)

Integrated Command & Control System (IC2S)--The single C2 system of the Air Force. The entire aggregation of all C2 subsystems viewed as one all-encompassing, integrated system. Also see C2 system.

IC2S Subsystems--Any subset, typically a development effort maintaining a product baseline, of the Integrated Command & Control System. Those subsystems that augment and support the decision making and decision executing processes of operational commanders and their staffs. The central, essential ingredient in the command and control system is the commander or decision-maker. Also referred to as a "subsystem" throughout the AFI.

Integrated Product Team (IPT)--An Integrated Product Team is collaborative team of representatives from users, developers (including industry), acquirers, maintainers, researchers, and testers (both developmental and operational) focused on the development of a specified product. The team tailors the spiral development process to concurrently develop and test requirements, systems, and operational concepts. To form an effective IPT, members must be:
empowered—have the authority to negotiate for the organizations they represent;
committed—provide continuous representation of their constituencies and ensure performance of actions necessary to achieving group objectives;

representative—represent their entire constituency, not just a part or their personal positions;
knowledgeable—be sufficiently aware of group objectives and have organizational technical and management expertise to ensure informed and effective collaboration; and
collaborative—operate as team players and work toward win-win solutions for all stakeholders.

Integrated Weapon System Management (IWSM)—A program management process that integrates all acquisition, evolution, and sustainment for systems, product groups, and material groups to ensure that each system and group can meet its peacetime and wartime missions. IWSM establishes a single manager for each system and group to meet U.S. Air Force, Foreign Military Sales, and other user requirements and manage resources. (AFI 63-107)

Joint Technical Architecture (JTA)--A set of performance-based, primarily commercial, information processing, transfer, content, format, and security standards that specify the logical interfaces in command, control, and intelligence systems and the communications and computers that directly support them. The JTA mandates use of DII COE.

Key Performance Parameter (KPP)--KPPs are those capabilities and characteristics considered most essential for successful mission accomplishment. Stated as threshold and objective performance parameters within Operation Requirements Documents, KPPs are those parameters so significant that failure to meet their minimum values (thresholds) could be cause for program revaluation or termination. (AFI 10-601)

Lead Command--The current MAJCOM assigned as the primary user representative to establish and interpret requirements for a given system. Also includes responsibility to advocate and fund for the same system.

Mission Need Statement (MNS)--A formatted non-system-specific statement containing operational capability needs and written in broad operational terms, describing required operational capabilities and constraints to be studied during the Concept Development activities.

Modular Contracting--The use of one or more contracts to acquire information technology systems in successive, interoperable increments. (FAR 39.002)

Operational Architecture--A description of the tasks and activities, operational elements, and information flows required to accomplish or support a military operation. (DoD C4ISR Architecture Framework)

Operational Concept of Employment--The user's description of how to operate and employ a system in conjunction with existing and projected AF, Joint, or Allied systems to execute the mission. It articulates the user's intent and lays the foundation for a more complete understanding of system operation. (AFI 10-601)

Operational Evaluation--The test and analysis of a specific end item or system, insofar as practicable under Service operating conditions, in order to determine if quantity production is warranted considering: a. the increase in military effectiveness to be gained; and b. its effectiveness as compared with currently available items or systems, consideration being given to: (1) personnel capabilities to maintain and operate the equipment; (2) size, weight, and location considerations; and (3) enemy capabilities in the field. (JP 1-02)

Operational Requirements Document (ORD)--The document that describes the capability required of (sub)systems. It shall reflect (sub)system-level performance characteristics and mission-level performance-based capabilities. It documents operationally-oriented parameters with thresholds and objectives in terms of specific capabilities, characteristics, and other related operational variables. (AFI 10-601)

Other Transactions--A legally binding instrument other than a procurement contract, grant, cooperative agreement, other transactions for research or other transaction for prototypes used to enter into relationships such as bailments, lease arrangements, and lease-to-own agreements, etc.

Single Acquisition Management Plan (SAMP)--A concise, comprehensive program document which serves two functions: (1) it is the management plan program managers follow to successfully execute the acquisition of a requirement; and (2) it is the supporting documentation which enables a milestone decision authority to reach a milestone decision.

Spiral--One subset of an increment that ends in a decision by an SDIPT affecting the development of a concept or baseline. Although spirals usually occur in series, they can overlap or occur in parallel.

Spiral Development--A method or process for developing a defined set of capabilities within one increment, providing opportunity for interaction between the user, tester, and developer communities to refine the requirements, provide continuous feedback and provide the best possible capability within the increment. The spiral development process is an iterative set of sub-processes which may include: establishing performance objectives; designing; coding/fabricating/integrating; experimenting; testing; assessing operational utility; making tradeoffs; and delivering. Other sub processes may be added as needed.

Spiral Development Decision Memorandum (SDDM)--A written memorandum documenting feedback points throughout each increment where the user, developer, acquirer, and tester review results to date to determine and agree on how to proceed toward delivery of the planned capability (e.g., make any needed refinements to the requirement or agree to proceed to certification/acceptance).

Spiral Development Increment Plan (SDIP)--A document outlining the plan to meet the objectives for one increment of an evolutionary acquisition.

System Engineering--A process that considers the complete spectrum of functional requirements such as hardware, software, training, support, reliability to produce a system that balances all requirements providing the most suitable capability for the user. For Evolutionary Acquisition, good system engineering should create a suitable architecture within the core capability that permits open standards and interfaces for adding future capabilities to a core capability.

Technology Insertion--An opportunity to provide for delivery, implementation, and testing of new technology solutions in discrete increments/blocks/modules.

Valid Requirement--A single or a set of user defined system characteristics approved in a formal requirements document such as an Operational Requirements Document (ORD) or a Capstone Requirements Document (CRD) (see AFI 10-601). For spiral development purposes, a valid requirement also includes derived requirements, such as a system capabilities description, that have been approved by an authorized user representative.